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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/774,763

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Nedeljko Varnica

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7590

10/23/2006

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EXAMINER

CHAUDRY, MUJTABA M

ART UNIT

PAPER NUMBER

2133

DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/774,763	<b>Applicant(s)</b> VARNICA ET AL.	
	<b>Examiner</b> Mujtaba K. Chaudry	<b>Art Unit</b> 2133	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 August 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 8-53 is/are pending in the application.
- 4a) Of the above claim(s) 1-7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-16, 36-38, 40-47 and 50-52 is/are rejected.
- 7) ☒ Claim(s) 17-35, 39, 48, 49 and 53 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/15/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

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## **DETAILED ACTION**

Applicants' response was received August 28, 2006. Claims 8-53 are elected without traverse and hereby considered for examination on the merits. Non-elected claims should be cancelled in subsequent communication.

### ***Information Disclosure Statement***

The references listed in the information disclosure statements (IDS) submitted September 15, 2004 were considered. Several references were not submitted with proper translation. Accordingly, the signed PTO-1449s are attached hereto.

### ***Oath/Declaration***

The Oath filed July 12, 2004 complies with all the requirements set forth in MPEP 602 and therefore is accepted.

### ***Drawings***

The drawings submitted July 12, 2004 are accepted.

### ***Specification***

Applicant is reminded of the proper language and format for an abstract of the disclosure. See MPEP 608.01(b).

***The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the***

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***computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.***

***The language should be clear and concise and should not repeat information given in the title or claim(s). It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.***

The abstract is objected to because:

- The abstract of the disclosure is objected to because it exceeds the length of 150 words.

Correction is requested.

#### ***Allowable Subject Matter***

Claims 17-35, 39, 48-49 and 53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Claim Objections***

Claim 11 is objected to because of the following informalities:

- In line 2, "...receiving the received information..." is incorrect grammar. Either it is received or it is being received, not both. It is suggest to omit the "received".

Appropriate correction is required.

Claim 12 is objected to because of the following informalities:

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- In line 2, "...receiving the received information..." is incorrect grammar. Either it is received or it is being received, not both. It is suggest to omit the "received".

Appropriate correction is required.

Claim 13 is objected to because of the following informalities:

- In line 2, "...receiving the received information..." is incorrect grammar. Either it is received or it is being received, not both. It is suggest to omit the "received".

Appropriate correction is required.

Claim 14 is objected to because of the following informalities:

- In line 2, "...receiving the received information..." is incorrect grammar. Either it is received or it is being received, not both. It is suggest to omit the "received".

Appropriate correction is required.

Claim 25 is objected to because of the following informalities:

- In line 2, "...intelligently..." is a relative term and therefore is not a positive limitation and needs to be omitted from claim language.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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- It is not clear in the claim language what “one value” is referring to.

Appropriate correction is requested.

### ***Claim Rejections - 35 USC § 103***

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 8-16, 36-38, 40-47 and 50-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (USPAN 2003/0135809) further in view of Richardson et al. (herein after: Richardson, USPN 6633856).**

As per claim 8, Kim substantially teaches a method for decoding received information encoded using a coding scheme (i.e., Figure 2), the method comprising: executing an iterative decoding algorithm for a predetermined first number of iterations to attempt to decode the received information (i.e., abstract, lines 5-8); upon failure of the iterative decoding algorithm to provide valid decoded information after the predetermined first number of iterations, altering the iterative decoding algorithm; and executing at least a first round of additional iterations of the iterative decoding algorithm (i.e., abstract, lines 9-14).

Kim does not explicitly teach to alter at least one value used by the iterative decoding algorithm as stated in the present application.

However, Richardson teaches, in an analogous art, (i.e., col. 16, lines 47-65 and Figure 9) to alter a value for iterative decoding. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the alteration of a value in the iterative decoding process of Kim as suggested by Richardson. This modification would have been obvious to one of ordinary skill in the art because one of ordinary skill in the art would have recognized that by altering the value within the iterative decoding process would have increased the probability of reaching a convergence signal (i.e., Richardson, col. 16, lines 49-52).

As per claim 9, Richardson substantially teaches, in view of above rejection, executing a message-passing algorithm (i.e., col. 3, lines 10-15); altering at least one value used by the message-passing algorithm (i.e., col. 16, lines 49-64) and executing another round of iterative decoding utilizing the altered value (i.e., col. 16, line 50).

As per claim 10, Richardson substantially teaches, in view of above rejection, the coding scheme is a low-density parity check-coding scheme, and wherein the message-passing algorithm is a standard belief-propagation (BP) algorithm (i.e., col. 6, lines 6-26).

As per claim 11, Kim substantially teaches, in view of above rejection, receiving information from a coding channel that includes at least one data storage medium (i.e., Figure 2, reference 110).

As per claim 12, Kim substantially teaches, in view of above rejection, receiving the information from a coding channel that is configured for use in a wireless communication system (i.e., paragraph 0005).

As per claim 13, Kim substantially teaches, in view of above rejection, receiving the information from a coding channel that is configured for use in a satellite system (i.e., paragraph 0005).

As per claim 14, Richardson substantially teaches, in view of above rejection, receiving the information from a coding channel that is configured for use in an optical communication system (i.e., col. 18, lines 15-19).

As per claim 15, Richardson substantially teaches, in view of above rejection, the message-passing algorithm is based on a bipartite graph for the coding scheme, and altering at least one likelihood value associated with at least one check node of the bipartite graph (i.e., col. 2, lines 59-65 and col. 16, lines 49-52 and Figure 6 and col. 15, lines 8-13).

As per claim 16, Richardson substantially teaches, in view of above rejection, the message-passing algorithm is based on a bipartite graph for the coding scheme, and altering at least one likelihood value associated with at least one variable node of the bipartite graph (i.e., col. 2, lines 59-65 and col. 16, lines 49-52 and Figure 6 and col. 15, lines 8-13).

As per claim 36, Richardson substantially teaches, in view of above rejection, selecting a different value for the at least one altered value; and executing at least a second round of iterations (i.e., col. 16, lines 47-65).

As per claim 37, Richardson substantially teaches, in view of above rejection, altering a different value for the at least one altered value; and executing at least a second round of iterations (i.e., col. 16, lines 47-65).



As per claim 38, Richardson substantially teaches, in view of above rejection, selecting a different value for the at least one altered value; and executing at least a second round of iterations until a valid decoded information is provided (i.e., col. 16, lines 47-65).

As per claim 40, Kim substantially teaches a apparatus for decoding received information encoded using a coding scheme (i.e., Figure 2), the method comprising: a decoder executing an iterative decoding algorithm for a predetermined first number of iterations to attempt to decode the received information (i.e., abstract, lines 5-8); a controller (i.e., Figure 2) upon failure of the iterative decoding algorithm to provide valid decoded information after the predetermined first number of iterations, altering the iterative decoding algorithm; and executing at least a first round of additional iterations of the iterative decoding algorithm (i.e., abstract, lines 9-14).

Kim does not explicitly teach to alter at least one value used by the iterative decoding algorithm as stated in the present application.

However, Richardson teaches, in an analogous art, (i.e., col. 16, lines 47-65 and Figure 9) to alter a value for iterative decoding. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the alteration of a value in the iterative decoding process of Kim as suggested by Richardson. This modification would have been obvious to one of ordinary skill in the art because one of ordinary skill in the art would have recognized that by altering the value within the iterative decoding process would have increased the probability of reaching a convergence signal (i.e., Richardson, col. 16, lines 49-52).

As per claim 41, Kim substantially teaches, in view of above rejection, receiving information from a coding channel that includes at least one data storage medium (i.e., Figure 2, reference 110).

As per claim 42, Kim substantially teaches, in view of above rejection, receiving the information from a coding channel that is configured for use in a wireless communication system (i.e., paragraph 0005).

As per claim 43, Kim substantially teaches, in view of above rejection, receiving the information from a coding channel that is configured for use in a satellite system (i.e., paragraph 0005).

As per claim 44, Richardson substantially teaches, in view of above rejection, receiving the information from a coding channel that is configured for use in an optical communication system (i.e., col. 18, lines 15-19).

As per claim 45, Richardson substantially teaches, in view of above rejection, the iterative decoding algorithm is a message-passing algorithm (i.e., col. 3, lines 10-15).

As per claim 46, Richardson substantially teaches, in view of above rejection, the coding scheme is a low-density parity check-coding scheme, and wherein the message-passing algorithm is a standard belief-propagation (BP) algorithm (i.e., col. 6, lines 6-26).

As per claim 47, Richardson substantially teaches, in view of above rejection, selecting a different value for the at least one altered value; and executing at least a second round of iterations until a valid decoded information is provided (i.e., col. 16, lines 47-65).

As per claim 50, Richardson substantially teaches, in view of above rejection, the message-passing algorithm is based on a bipartite graph for the coding scheme, and altering at least one likelihood value associated with at least one variable node of the bipartite graph (i.e., col. 2, lines 59-65 and col. 16, lines 49-52 and Figure 6 and col. 15, lines 8-13).

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As per claim 51, Richardson substantially teaches, in view of above rejection, selecting a different value for the at least one altered value; and executing at least a second round of iterations (i.e., col. 16, lines 47-65).

As per claim 52, Richardson substantially teaches, in view of above rejection, altering a different value for the at least one altered value; and executing at least a second round of iterations (i.e., col. 16, lines 47-65).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional pertinent prior arts are included herein for Applicant's review:

**Hagenauer et al.** teach an adaptive abort criterion in iterative decoding of transmitted, multi-dimensionally encoded information employs the relative entropy, approximations of the relative entropy or quantities similar thereto as criterion for the change in the weighted decisions of successive iteration sub-steps. When an iteration sub-step does not produce a change of the relative entropy lying above a predetermined threshold, then the iterative decoding is aborted.

**Yu et al.** teach a forward error correction method for decoding coded bits transmitted over a radio channel after being generated by encoding binary bits with low density parity check matrixes. The method comprises converting each of the coded bits into a log likelihood ratio (LLR) value indicating a ratio of probability of zero to probability of one, and applying the converted values to variable nodes; delivering messages applied to the variable nodes to check nodes connected to the variable nodes; checking a message having a minimum value among the messages delivered from the variable nodes, and determining a sign of the message having the minimum value; receiving messages updated in the check nodes, adding up signs of the received messages and a sign of an initial message, applying a weighting factor of 1 when all signs are identical, and when all signs are not identical, updating a message of a variable node by applying a weighting factor having a predetermined value to the sum of messages received from all other check nodes and adding a initial value to the weighted sum; determining LLR of an initial input value; and hard-deciding values of the variable nodes, performing parity check on the hard decision values, and stopping the decoding when no error occurs as a result of the parity check.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mujtaba K. Chaudry whose telephone number is 571-272-3817.

The examiner can normally be reached on Mon-Thur 9-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Mujtaba Chaudry  
Art Unit 2133  
October 17, 2006